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ABSTRACT

This study explored the relationship between fear of automation and teachers' attitudes toward instructional media. Ten terms describing instructional devices were presented under three experimental conditions: replacement, adjunct, and neutral. Five of the devices were considered traditional while the remainder were associated with instructional technology. The subjects, 112 graduate students in education who were teachers or applying for teaching posts, rated each term using six bipolar scales. Results strongly confirmed the hypothesis that fear of automation is an important variable in modifying teachers' attitudes toward terms describing instructional media. Terms directly denoting technology (teaching machine, automated instruction, computer based instruction, computer managed instruction, educational technology) evoked more negative attitudes than the more traditional terms (textbook, flash card, workbook, film strip, exercise book), regardless of instructional set. The group receiving replacement instructions had a less positive attitude toward the terms than either of the other two groups. In the replacement group, moreover, even the more traditional terms, which received very positive responses in general, were viewed much more negatively once they were associated with a phrase suggesting that such devices might be used as a replacement for the teacher. It was concluded that educators and instructional technologists should be circumspect in the selection of terms describing new instructional equipment, and that attention should be paid to teachers' attitudes in media workshops and related activities. Failure to deal with these attitudes may have the effect of teachers' attitudes biasing student performance on new instructional equipment in a negative direction. (Author/MJB)

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Fear of Automation in Teachers' Attitudes Toward Instructional Media

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Fear of Automation in Teachers' Attitudes Toward Instructional Media[1]

Previous research on teachers' feelings toward instructional media, such as programmed instruction, computer assisted instruction, etc., has suggested that fear of replacement by automated devices may well be an important factor influencing teachers' attitudes. Tobias (1963) examined teachers' attitudes toward three groups of terms describing instructional devices. The terms were substantially similar and differed mainly in the degree to which each term connoted automation. One set of terms described traditional teaching aids such as flash card, workbooks, and exercise books. The other two sets described materials connected with programmed instruction; one group of terms described these materials with labels stressing mechanization and automation, while the other set omitted these implications. The results indicated that the least favorable attitudes were held concerning terms connoting automation, followed by the programming terms, with the traditional terms receiving the most favorable responses. Significant differences among essentially synonymous terms, such as programmed instruction and automated instruction, were found and attributed to the differences in the degree to which the terms connoted automation.

A further study (Tobias, 1966) attempted to determine the degree to which fear of automation, and other variables affected teachers' attitudes toward instructional media. In this study, three terms drawn from the field of audiovisual education were added to the terms used in the prior investigation. Three sets of terms, the audiovisual, automated, and programming groups, each contained one term using the word tutor as a suffix or prefix, i.e. TV tutor, mechanized tutor, tutor text. Since these terms most directly suggested replacement of the teachers' function it was expected that teachers would have the most negative reaction to them. This prediction was clearly confirmed.

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In a further study (Tobias, 1968), teachers' ratings of 16 terms describing instructional media were factor-analyzed. Three varimax-rotated factors emerged from this analysis. The obtained factor structure was interpreted in terms of whether a particular device was used under the control of the teacher or in the absence of the teacher. Two of the factors had high loadings on devices used in the absence of the teacher (e.g. automated instruction, TV tutor), and one factor had high loadings on instructional devices used in the classroom by the teacher (e.g. workbook, exercise book). Results indicated that the latter factor received significantly more favorable ratings than did either of the others.

In a further study (Tobias, 1969), the factor structure reported in a prior investigation (Tobias, 1968) was replicated and factor scores were computed for all subjects and correlated with their achievement on instructional material using a linear programmed instructional format. As expected, the correlations between achievement from programmed instruction and factor scores was significant for both factors; the correlation for factor I (programming- automation) being .26 and -.42 with factor II (traditional devices). These correlations suggested that the subjects underlying attitudes toward instructional media account for a substantial percentage of the achievement variance. Moreover, evidence suggesting that preferences for one kind of instructional medium (i.e. traditional devices) is negatively related to achievement from programmed instruction was found. The results of this study implied that negative attitudes of the subjects interfered with their own achievement from programmed materials. Further, these findings fit with previous research (Tobias, 1963, 1968; King, 1975) that suggested that teachers' negative attitudes toward programmed instruction might interfere with a pupil's achievement from such materials.

The purpose of this study was to test the fear of automation hypothesis more directly. Thus, it was expected that when terms describing instructional media were modified to indicate use as a replacement for the teacher, the attitudes of the teachers' toward these terms would be less positive than if the terms were presented without such modification. Terms describing the same instructional devices but which were modified to indicate use of the device as an adjunct to the teacher were expected to elicit the most positive attitudes since they clearly did not imply teacher replacement. Further, it was expected that the teachers' attitudes toward the more traditional instructional terms, such as flash card, workbook, etc., would be less positive when these terms were coupled with a modifier denoting replacement of the teacher than terms denoting automation, such as automated instruction or teaching machine. Specifically, the differences between the neutral condition and the condition denoting replacement of the teacher would be greater for the more traditional terms than for those terms which denote automation since the latter connote replacement to begin with.

Method

Subjects were randomly assigned to three different experimental conditions: replacement, adjunct, and neutral. Subjects were asked to express their attitudes toward ten terms describing instructional media as they were modified by the experimental condition. In the replacement condition each term was modified by a phrase indicating that the instructional device would supplant the teacher. The same ten terms were accompanied in the adjunct condition by a phrase denoting that the device would be used in addition to the teacher. And in the neutral condition, the terms were presented without modification.

Subjects. The subject pool consisted of 112 students drawn from graduate level Education classes at City College, CUNY, during the Spring '76 semester. Almost all of the subjects were teachers or applying for teaching posts at the time of the study.

Procedure. Five of the ten terms used to describe the instructional media were considered traditional, while the remaining five terms have come to be associated with the more contemporary instructional technologies. The terms textbook, flash card, workbook, film strip, and exercise book were considered traditional. The technological terms used were teaching machine, automated instruction, computer based instruction, computer managed instruction, and educational technology.

In the replacement condition each of these terms was accompanied by phrses such as: "to replace the teacher", "instead of instruction by the teacher", "a teacher substitute", and the like. The ten terms were accompanied in the adjunct condition by phrases like the following: "directed by the teacher", "as an adjunct to class work", "to assist the teacher", etc. In the neutral condition the terms describing the instructional media were presented without any modifiers.

Subjects were asked to rate their attitudes toward these ten terms on six bipolar scales selected from the semantic differential (Osgood, Suci, and Tannenbaum, 1957). The scales were chosen for their high saturations on the evaluative factor. Each scale had a loading of .85 or above on the evaluative factor and negligible loadings on the others, suggesting that they were likely to elicit value judgments predominantly. The following bipolar scales were used: Good-Bad, Worthless-Valuable, Fair-Unfair, Meaningless-Meaningful, Wise-Foolish, and Reputable-Disreputable. The positive and negative poles were varied to avoid positional bias. Moreover, the sequence in which the terms appeared was determined randomly. Each term, with or without a modifying phrase, appeared at the top of the page and the semantic differential scales appeared below it. Each booklet, too, was collated beginning with a different

term. Thus, while the sequence was fixed, though randomly determined, the terms were presented in all possible orders from one to ten. Subjects were instructed to rate their attitudes toward all the terms according to their feelings about them, even if they did not recognize a particular term.

Results & Discussion

The semantic differential scales were assigned scores from seven for the positive pole of each scale, to one for the negative pole. The scale scores for each term were then added, yielding a maximum score of 42 for each term, and a minimum score of six. Each of the six bipolar scales tended to elicit highly uniform values for a given term, as was expected on the basis of their high saturations on the evaluative factor of the semantic differential. Figure 1 illustrates the mean attitude scores for each device under the three instructional conditions.

Insert Figure 1 about here

A 3x10 ANOVA with repeated measures on the second factor was performed and the results appear in Table 1. As expected,

Insert Table 1 about here

there were highly significant differences between the instructions, among the terms, and in the interaction between instructions and terms. The results of previously selected comparisons suggested that, irrespective of instructional set, the more traditional terms elicited more positive attitudes than the terms denoting technology, $t(981)=5.21$, $p<.001$, and that the neutral and adjunct groups combined had more favorable attitudes than did the replacement group, $t(109)=6.35$, $p<.001$. Likewise, the difference between the neutral and adjunct groups combined and the replacement group on the traditional terms was greater than any of the others, $t(981)=13.58$, $p<.001$. Unexpectedly,

there were no significant differences between the neutral and the adjunct groups. This suggests that the teachers viewed the instructional media presented under the neutral condition as being used by them and not necessarily as a replacement for them.

These results strongly confirm the hypothesis that fear of automation is an important variable in modifying teachers' attitudes toward terms describing instructional media. Terms directly denoting technology evoked more negative attitudes than the more traditional terms, regardless of instructional set. As expected, the group receiving replacement instructions had less positive attitudes toward the terms than either of the other two groups. In the replacement group, moreover, even the more traditional terms such as workbook, exercise book, etc., which received very positive responses in general, were viewed much more negatively once they were associated with a phrase suggesting that such devices might be used as a replacement for the teacher.

Lastly, the results of this study strongly suggest that the introduction of instructional devices denoting technology appear to evoke strong feelings of fear regarding replacement by such equipment. This fear is likely to be especially pronounced at a time when there is a surplus of teachers. It behooves educators and instructional technologists to be circumspect in the selection of terms describing new instructional equipment, and it implies that attention be paid to teachers' attitudes in media workshops and related activities. Failure to deal with these negative attitudes may have the effect of teachers' attitudes biasing student performance on new instructional equipment in a negative direction.

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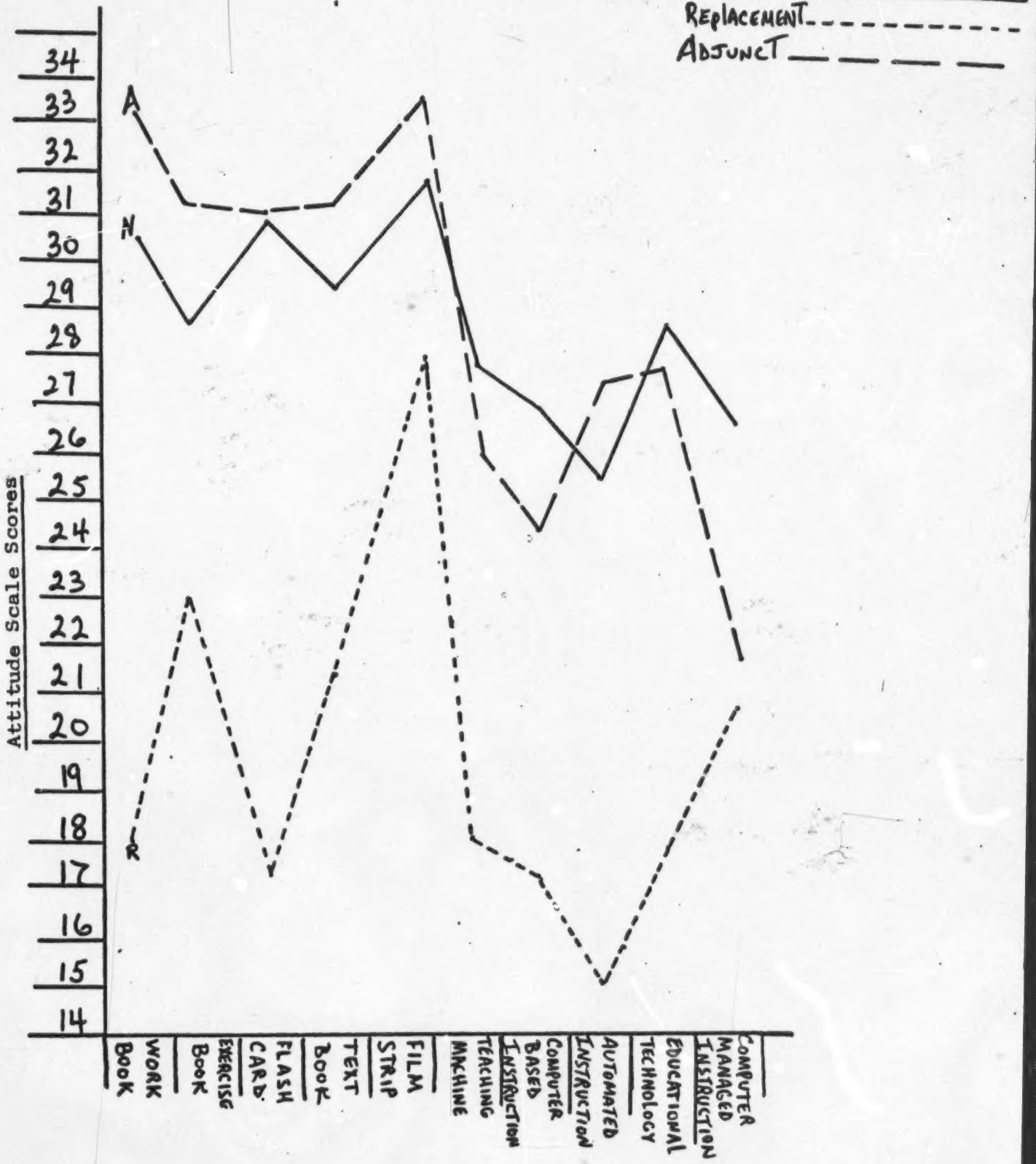

Figure 1. Mean attitude scores for each instructional device.

Table 1

Analysis of Variance Results with Repeated Measures on the Second Factor

Source	df	MS	F	p
Instructions	2	10160.47	45.21	<.001
Error within	109	224.73		
Terms	9	796.23	15.47	<.001
Instructions x Terms	18	180.64	3.51	<.001
Error between	981	51.47		